

Draft Problem Statement

Blackwood Creek Total Maximum Daily Load (TMDL) For Sediment

OVERVIEW

Blackwood Creek once supported large runs of rainbow trout in the spring and more modest runs of brown trout in the fall. Disturbances along the stream channel have detrimentally affected the creek's fisheries. Sediment deposition, erosion of streambanks, loss of riparian vegetation, and reduction of pool habitats have created poor conditions for spawning runs. In addition, significant fish passage problems exist due to road culverts, a stream diversion/fish ladder structure, and excess sediment deposition from upstream sources that has formed an obstruction at the mouth of Blackwood Creek. Further geomorphic changes in the lower portion of the creek also restrict fish passage during low flow periods.

PROJECT AREA DESCRIPTION

Geography

Blackwood Creek (Hydrologic Unit # 634.200) is located in the Lake Tahoe Basin (within Placer County) and is tributary to Lake Tahoe. Lake Tahoe is at 6,230 feet above mean sea level (amsl), with nearby area peaks reaching 8,878 amsl. Blackwood Creek watershed encompasses 11.2 square miles on the west-central side of the Lake Tahoe Basin. The drainage is six miles in length. At the bottom end of the watershed near the mouth of the creek, the terrain is rather flat and broad due to the influence of glaciation.

Water Body Description

Blackwood Creek is a perennial stream, with many areas of steep uplands draining to the creek. The creek branches into a number of channels, some more impacted than others. The pool/riffle ratio is low, creating difficulties for the existing fishery. Many areas of the watershed and the creek were severely damaged during a rain-on-snow flood event in 1997, creating stream blockages and rerouting the stream, or causing large slugs of sediment to be deposited within the creek.

Geology and Soils

The Blackwood drainage is composed predominantly of volcanic rocks including both andesite flows and volcanic mudflows (laharic breccias).

Climate and Hydrology

The Blackwood Creek watershed has an alpine climate with warm dry summers and cold winters. Precipitation typically occurs as snow throughout the winter, with periodic thunderstorms producing a small percentage of precipitation during the summer months. Precipitation is greatest near the western summits where an average of 80 inches of precipitation falls per year. Precipitation near the mouth of the creek at Lake Tahoe is 40 inches per year. The average precipitation has been estimated to be 60 inches per year,

with approximately 90 percent falling as snow. Average annual runoff is 27,000 acre-feet per year.

Aquatic and Terrestrial Biological Resources

There are nine fish species that occur and may spawn in Blackwood Creek given the proper conditions. Gamefish species include rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). There is a remote possibility that kokanee salmon (*Onchorhynchus nerka*) spawn in the creek, but since high stream flows are necessary to gain access to Blackwood Creek, kokanee have access only during high flows in wet years. These salmonid species typically migrate from Lake Tahoe and use the stream to spawn. Other fish species that are present in Blackwood Creek include the Tahoe sucker (*Catostomus tahoensis*), mountain sucker (*Catostomus platyrhynchus*), Lahontan redbreast (*Richardsonius egregius*), speckled dace (*Rhinichthys osculus*), and Piute sculpin (*Cortus beldingi*).

Coniferous forests dominate the hillsides. The exceptions are areas of steep, barren rock and outcrops that are most numerous in the highest areas of the watershed. Along the narrower stream corridors, cottonwoods, aspen and deciduous shrubs are the dominant vegetation. In the broader areas of the valley, willows, sedges and riparian grasses form several large meadows.

Land Use

The majority of the watershed is public land managed by the USFS - Lake Tahoe Basin Management Unit. Other smaller private land holdings and developments are also present in the watershed.

Numerous recreational uses, including mountain biking, hiking, fishing, hunting, backpacking, horseback riding, off-highway vehicle travel (OHV) and camping, occur primarily in the summer months. In the winter, cross-country skiing and snowmobiling are popular activities. Recreation and other land uses have increased sediment load to the creek due to vegetation disturbance, channelization of some hill slope drainages, and hill slope erosion.

Historical land uses, including livestock grazing and logging, were conducted throughout the watershed during the 1800s and continued as late as 1969. These practices no longer occur in the Blackwood Creek watershed; however, these practices led to removal of vegetative cover and related consequences, such as increased surface runoff, bank scour, and erosion, which has contributed to sediment and debris entering the stream and altering the morphology of the stream channel.

Additionally, historic gravel mining took place along the stream bed until 1968. Stream flow diversions during this operation led to increased sediment loading to Blackwood Creek. Subsequent high flows caused bank scour, destabilized stream banks, and undermined riparian vegetation that increased debris entrainment into the stream system. Gravel removal and related disturbances also increased the stream gradient at and above the mine site. Subsequent diversion of the creek back into its original channel allowed

coarse sediment from upstream of the mine site to become trapped leading to increased sediment transport below this area during high flows.

LISTING BASIS

Beneficial Uses

The cold-water fishery and other life-cycle-related components of migration and spawning are the most impaired beneficial uses in the watershed. Channel instability appears to be a major source of excess sediment loads in the main channel. This condition causes impairment of beneficial uses for cold freshwater habitat (COLD), spawning habitat (SPWN), migration of aquatic organisms (MIGR), and rare species habitat (RARE) (see Water Quality Control Plan for the Lahontan Region [Basin Plan] for additional descriptions). The impacts of sediment loading on beneficial uses are most significant during catastrophic stream bank failures associated with extreme flow events. Excessive sediment loads have severely impacted the stream channel morphology and function, and resulted in the loss of riparian vegetation. Additional aquatic habitat impairments are expected to occur in areas of vegetation disturbance within Stream Environment Zones (SEZs) unless mitigated.

Water Quality Standards

Narrative water quality objectives for Blackwood Creek include standards for sediment, settleable materials, suspended materials, and turbidity (refer to Basin Plan Chapter 3). The regional-wide non-degradation objective and non-degradation standards for aquatic communities and populations also apply to the watershed. Numeric standards are established in the Basin Plan for total dissolved solids (70 mg/L), chloride (0.30 mg/L), total iron (0.03 mg/L), sulfate (1.4 mg/L), total nitrogen (0.15 mg/L), and total phosphorous (0.015 mg/L). Information that has been used to identify violations of either numeric or narrative water quality standards include complaints, site inspections, and investigations conducted by the University of California's Tahoe Research Group.

Impairment

Watershed degradation has resulted in hydrologic conditions that create channel instability and excessive sediment loads to the stream. The geology, topography, and location of the Blackwood Creek watershed play a large role in the sediment production and discharge to the creek, which is exacerbated by human-influenced sediment sources such as channel erosion, soil and vegetation disturbance, logging, and housing developments. Excess sediment in Blackwood Creek ultimately impairs water quality in Lake Tahoe by reducing clarity of that water body.

Destabilization and alteration of the channel morphology has had the most significant influence on the deterioration in the Blackwood Creek fisheries. Structural blockages associated with culverts and a non-functional fish ladder have created impacts on fisheries. The process of excess fine sediment loading to the creek contributes to the filling of spawning gravels and refuge pools, resulting in reduced spawning and rearing habitat and an overall reduction in spawning success.

SCHEDULE/STATUS

The sediment TMDL for Blackwood Creek is being developed in conjunction with data gathering efforts for the Lake Tahoe sediment and nutrient TMDLs. The Blackwood Creek TMDL may be combined with the development of the Lake Tahoe TMDL, which is scheduled for completion in 2006. Otherwise, the Blackwood Creek TMDL will be developed after the completion of the Lake Tahoe TMDL.

Contact Information

Dave Roberts
Environmental Scientist
Lahontan RWQCB - South Lake Tahoe Office
2501 Lake Tahoe Boulevard
South Lake Tahoe, CA 96150
(530) 542-5469
droberts@rb6s.swrcb.ca.gov